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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/734,186	12/15/2003	Masaru Fuse	2003_1821	2169

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EXAMINER
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LEUNG, CHRISTINA Y

ART UNIT	PAPER NUMBER
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2633

DATE MAILED: 08/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/734,186	Applicant(s) FUSE ET AL.	
	Examiner Christina Y. Leung	Art Unit 2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 December 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 8 and 9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 8 and 9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☒ Certified copies of the priority documents have been received in Application No. 09/140,658.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>15 December 2003</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Priority*

1. Acknowledgment is made of Applicants' claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. 09/140,658, filed on 26 August 1998. Examiner respectfully notes that although the instant application has been filed as a divisional of application 10/294,759, Examiner did not make a restriction requirement for that parent application or parent application 09/140,658.

### *Double Patenting*

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

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3. Claims 8 and 9 rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 4 of U.S. Patent No. 6,512,621 B1. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 8 or the instant application recites:

8. FM modulator comprising:  
a first light emitting device which emits a first frequency-modulated optical signal according to a first input signal;  
a second light emitting device which emits a second frequency-modulated optical signal according to a second input signal;  
a level adjusting portion which equates frequency deviation of said first and second frequency-modulated optical signals; and  
an optoelectric conversion circuit which receives said first and said second frequency-modulated optical signals for heterodyne detection;  
wherein said second input signal has an inverted phase of said first input signal.

Claim 9 of the instant application recites:

9. FM modulating method comprising steps of:  
a first light emitting step which emits a first frequency-modulated optical signal according to a first input signal;  
a second light emitting step which emits a second frequency-modulated optical signal according to a second input signal;  
a level adjusting step which equates frequency deviation of the first and second frequency modulated optical signals; and  
an optoelectric conversion step which receives and mixes said first and said second frequency-modulated optical signals for heterodyne detection; and  
wherein said second input signal has an inverted phase of said first input signal.

Claim 1 of US 6,512,621 B1 recites:

1. An FM modulator for converting an electrical signal into a frequency-modulated signal by an optical heterodyne method, comprising:  
a branch portion for outputting, when said electrical signal is inputted, a phase-uninverted signal (hereinafter referred to as an in-phase signal) and a phase-inverted signal (hereinafter referred to as an opposite phase signal);  
a first frequency modulation light source element (hereinafter referred to as a first FM light source element) having a property of uniquely converting an amplitude change in the inputted electrical signal into an optical frequency change of outputted light, for converting said in-phase signal into a frequency-modulated first optical signal having a center wavelength  $\lambda_1$ ;

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a second frequency modulation light source element (hereinafter referred to as a second FM light source element) having a property of uniquely converting an amplitude change in the inputted electrical signal into an optical frequency change of outputted light, for converting said opposite phase signal into a frequency-modulated second optical signal having a center  $\lambda_2$ ;

and an optical-electrical converting portion for subjecting said first and second optical signals to optical heterodyne detection and then generating a beat signal at a frequency corresponding to a wavelength difference  $\Delta \lambda (= |\lambda_1 - \lambda_2|)$  between both of the optical signals.

Claim 2 of US 6,512,621 B1, which depends on the above-recited claim 1, further recites:

2. The FM modulator according to claim 1, further comprising:

an amplitude adjusting portion inserted at least either between said branch portion and said first FM light source element or between said branch portion and said second FM light source element, for adjusting amplitude of the inputted electrical signal to equate frequency deviation of said first and second optical signals.

As shown above, claim 8 of the instant application and claim 2 of US 6,512,621 B1 are differently worded but are both similarly directed to an FM modulation apparatus including first and second frequency modulating light emitting devices which emit first and second frequency-modulated optical signals according to first and second input signals respectively, wherein one of the input signals is phase inverted with respect to the other input signal, and wherein the first and second optical signals are subjected to heterodyne detection. Examiner notes that although the claims of the instant application do not explicitly recite “generating a beat signal at a frequency corresponding to a wavelength difference  $\Delta \lambda (= |\lambda_1 - \lambda_2|)$  between both of the optical signals,” it is well understood in the art that generating such a beat signal is an inherent result of the heterodyne detection already recited.

Examiner notes that claim 8 of the instant application and claim 2 of the patent also both recite an element that “equates frequency deviation” of the first and second frequency-modulated optical signals. The claim in the patent differs from the claim of the instant application in that the patent particularly recites that this frequency deviation equating element is “an amplitude

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adjusting portion” inserted in a specific location of the structure, but the instant application only recites “a level adjusting portion” without any further limitations regarding the specific nature or placement of the element. It would have been obvious to a person of ordinary skill in the art to use either the “level” adjusting portion recited in the instant application or the “amplitude” adjusting portion recited in the patent in order to implement the frequency deviation equating function recited by both, since both claim limitations are directed to changing the relative amplitude or level of the first and second signals ultimately received by the optoelectronic conversion element also recited by both claims.

Regarding claim 9 of the instant application in particular, although the patent does not specifically include a method claim that corresponds to this claim (in the way that apparatus claim 2 corresponds to apparatus claim 8 of the instant application), it would be well understood in the art that claim 9 of the application is a method with steps directly corresponding to the functions performed by the apparatus recited in claim 8 of the application. Therefore, claim 9 of the application recites steps corresponding to the functions performed by the apparatus recited in claims 1 and 2 of the patent as discussed above. Given the apparatus recited in claims 1 and 2 of the patent, it would have been obvious to a person of ordinary skill in the art to provide the method as recited in claim 9 of the application as a way to provide FM modulation using that apparatus.

*Allowable Subject Matter*

4. The following is a statement of reasons for the indication of allowable subject matter:

The prior art does not disclose or teach an FM modulator as claimed wherein the structure includes a first input signal and a second input signal, with a phase inverted to that of

the first input signal, which are respectively input to first and second light emitting devices and converted in into first and second frequency modulated optical signals before being subjected to heterodyne detection. In particular, the prior art does not disclose or teach such an FM modulator as claimed including two frequency-modulating light emitting devices.

Unlike the instant application, Kikushima et al. (US 5,896,216 A) disclose an AM to FM converter (Figure 4) that subjects two optical signals to heterodyne detection (within element 112). However, only the first optical signal is frequency modulated by an electrical input, while the second optical signal is not. Furthermore, the phase-inverting branch element disclosed by Kikushima et al. is used to create a phase-inverted version of the original electrical input for combination with the electrical signal output from the heterodyne detection element.

Again unlike the instant application, Fuse et al. (US 5,923,458 A) and Fuse et al. (US 5,973,820 A) disclose frequency modulators (Fuse et al. '458, Figure 1; Fuse et al. '820, Figure 1) wherein only one of two optical signals subjected to heterodyne detection has been frequency modulated by an electrical input.

Examiners notes that claims 8 and 9 are currently rejected under the judicially created doctrine of obviousness-type double patenting and are not currently allowed.

### ***Conclusion***

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christina Y. Leung whose telephone number is 703-605-1186. The examiner can normally be reached on Monday to Friday, 6:30 to 3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 703-305-4729. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4700.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*Christina Y Leung*  
*Christina Y Leung*  
*Patent Examiner*  
*Art Unit 2633*